DECEMBER 1994 **HISTORICAL CLIMATOLOGY SERIES 4-7**
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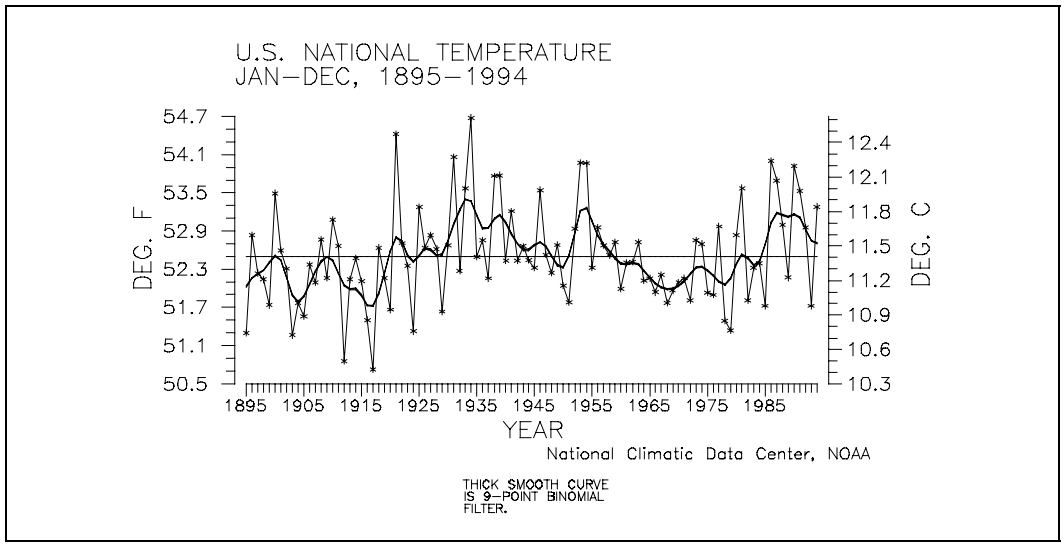
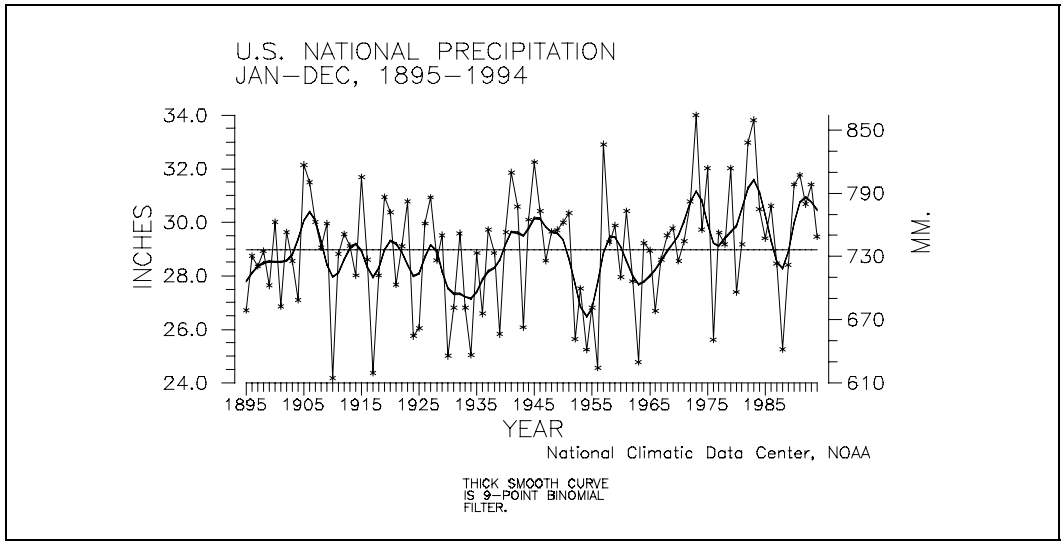
CLIMATE VARIATIONS BULLETIN





noaa NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION / NATIONAL ENVIRONMENTAL SATELLITE, DATA, AND INFORMATION SERVICE / NATIONAL CLIMATIC DATA CENTER ASHEVILLE, N.C.

This CLIMATE VARIATIONS BULLETIN (CVB) is a preliminary report that puts current monthly climate anomalies into historical perspective using climate databases archived at the National Climatic Data Center (NCDC). It is issued on a monthly basis. Supplemental sections are included which address seasonal and annual perspectives, when appropriate.

Current data are based on preliminary reports from First and Second Order airport stations obtained from the National Weather Service (NWS) Climate Analysis Center, and preliminary tornado statistics obtained from the NWS National Severe Storms Forecast Center. THE CURRENT DATA SHOULD BE USED WITH CAUTION. These preliminary data are useful for estimating how current anomalies compare to the historical record, however the actual values and rankings for the current year will change as the final data arrive at NCDC and are processed.

The following NCDC datasets are used for the historical data: the climate division drought database (TD-9640), the hurricane datasets (TD-9636 and TD-9697), the tornado dataset (STORM DATA), and the monthly station dataset (LCD supplemental files). It should be noted that the climate division drought database consists of monthly data for 344 climate divisions in the contiguous United States. These divisional values are calculated from the 6000+ station Cooperative Observer network.

The narrative, tables, and graphs in the CVB are also available via automated facsimile. The previous month's summary can be obtained after the tenth of the month by dialing 704-271-4570 and selecting the appropriate menu codes. A touch-tone fax machine is required.

If you have access to the Internet, copies of the CVB are available via both the NCDC's World Wide Web (WWW) server and the NCDC's anonymous FTP server.

NCDC's WWW server
URL for the CVB: http://www.ncdc.noaa.gov/publications/cvb/cvb.html

NCDC's anonymous FTP server
Machine: ftp.ncdc.noaa.gov
Directory: /pub/data/cvb

If you are a climate researcher and would like to order copies of the historical datasets used to make graphs of the type in this report, call 704-271-4994 or fax a letter to 704-271-4876 or mail a letter to the address given below, ATTN: Research User Services.

All other questions or requests for data should be made by calling 704-271-4800 or sending a fax to 704-271-4876 or by writing to:

National Climatic Data Center, NOAA
Federal Building
151 Patton Avenue, Room 120
Asheville, NC 28801-5001

If you use any of the information from this CVB, please identify "National Climatic Data Center, NOAA" as the source.

UNITED STATES DECEMBER CLIMATE IN HISTORICAL PERSPECTIVE

Richard R. Heim Jr.
National Climatic Data Center, NOAA
Global Climate Lab, Climate Perspectives Branch
Federal Building
Asheville, NC 28801 USA

Preliminary data for December 1994 indicate that temperature averaged across the contiguous United States was much above the long-term mean (see Figure 1). December 1994 ranked as the eleventh warmest December since national records began in 1895 (see Tables 1 and 3). The 1994 value is based on preliminary data, which has been shown to be within 0.26°F (0.14°C) of the final data over a 46-month period. This confidence interval is indicated in the figure by '+'. The darker smooth curve is a nine-point binomial filter that averages out the year-to-year fluctuations and shows the longer-term variations. One sixth (17.1%) of the country averaged much warmer than normal while none (0.0%) of the country averaged much cooler than normal for December 1994.

Areally-averaged precipitation for the nation was below the long-term mean, ranking December 1994 as the 34th driest December on record. The preliminary value for precipitation is estimated to be accurate to within 0.14 inches (3.56 millimeters) and the confidence interval is plotted in Figure 2 as a '+'. One twentieth (5.4%) of the country experienced much wetter than normal conditions while one sixth (15.8%) of the country was much drier than normal.

Historical precipitation is shown in a different way in Figure 3. The November precipitation for each climate division in the contiguous U.S. was first standardized using the gamma distribution over the 1931-90 period. These gamma-standardized values were then weighted by area and averaged to determine a national standardized precipitation value. These national weighted values were then normalized over their period of record. Negative values are drier and positive values are wetter than the mean. This index gives a more accurate indication of how precipitation across the country compares to the local normal (60-year average) climate. The national standardized precipitation ranked December 1994 as the 25th driest December on record.

The December 1994 temperature and precipitation ranks for the nine climatically homogeneous regions in the United States are listed in Table 1. The general precipitation pattern for the month consisted of dry ranks in the northern regions, a wet rank in the South region, and ranks in the moderate range in the southeastern and southwestern corners of the country. The West North Central region had the tenth driest December in 1994, marking the tenth consecutive year with December precipitation near to well below the long-term mean (Figure 4). At the other extreme, the South region had the 21st wettest December on record in 1994 (Figure 5).

The temperature pattern for December 1994 was very simple, consisting of moderate ranks in the West and Northwest regions, and warm ranks in all regions eastward (Table 1). Four regions (the Northeast, Central, Southeast, and East North Central) had the tenth warmest, or warmer, December in 1994. When November's temperatures are considered along with those of December, the ranks become even more extreme. The Northeast and Central regions had the second warmest November-December on record in 1994 (see Table 1). November-December 1994 marks the fifth consecutive such two-month period with temperatures above the long-term mean for the Northeast region, with this string of mild Decembers following the second coldest November-December on record which occurred in 1989 (Figure 6). At the other extreme, the West region had the fifth coldest November-December in 1994, with four of the last five years having November-December much below the long-term mean (Figure 7).

Precipitation averaged across the Primary Hard Red Winter Wheat agricultural belt for the growing season to date (October-December) was well above the long-term mean (Figure 8).

On a statewide basis, 20 states (CT, IL, IN, KY, MD, MA, MI, MN, NH, NJ, NM, NY, NC, OH, PA, RI,

VT, VA, WV, and WI) had December 1994 average temperatures ranking in the top ten warmest category. These were mostly from the northern Plains to Mid-Atlantic coast and the Northeast, but included New Mexico (see Figure 9A). No states ranked in the top ten coldest category. Five states (DE, MI, MT, SC, and TX) had the tenth driest, or drier, December in 1994, while two states (SC and TX) ranked in the top ten wettest category (see Figure 9B). ***It should be noted that the December precipitation ranks are preliminary and should be used with considerable caution due to the high variability of precipitation on a small space and time scale.***

The overall national picture of severe to extreme long-term wet and dry conditions remained fairly stable over the last several months. Long-term drought conditions (as defined by the Palmer Drought Index) for the last three months averaged slightly less than 10% of the contiguous U.S., while the percent coverage of severe to extreme wet area for the last six months remained fairly steady at just over 10% of the nation (Figure 10). The primary areas of long-term drought were in the Pacific Northwest and Southwest regions (see Table 2). Unusually wet conditions gave the Missouri, Texas Gulf Coast, and Souris-Red-Rainy river basins the tenth wettest, or wetter, hydrologic year thus far (October-December) in 1994 (see Table 2). This contributed to the increase in the percent area severely to extremely wet (according to the Palmer index) for these regions.

UNITED STATES ANNUAL CLIMATE IN HISTORICAL PERSPECTIVE

Richard R. Heim Jr.
National Climatic Data Center, NOAA
Global Climate Lab, Climate Perspectives Branch
Federal Building
Asheville, NC 28801 USA

Preliminary annual (January-December) data for 1994 indicate that temperature averaged across the contiguous United States was above the long-term mean. For the nation, 1994 was the 16th warmest year on record (Table 1) and marked a return to the warm conditions which have dominated much of the last nine years (see Figure 11). A fourth (26.3%) of the country averaged much warmer than normal in 1994 while none of the country (0.0%) had annual average temperatures in the much colder than normal category.

Areally-averaged January through December precipitation for the nation was near the long-term mean, ranking 1994 as the 46th wettest year on record (see Table 1 and Figure 12). The national standardized precipitation index (Figure 13) ranked 1994 as the 49th driest year on record (page 1 explains how this index is computed). The standardized precipitation index (Figure 13) provides a climatological perspective of the season's anomalies, taking local normal climate into account so that regions with large precipitation amounts do not dominate the index value. Areally-averaged precipitation (Figure 12) provides a hydrological perspective. One twelfth (8.0%) of the country experienced much wetter than normal annual conditions and one twelfth (8.2%) of the country was much drier than normal for 1994.

The annual temperature and precipitation ranks for 1994 for the nine climatically homogenous regions in the United States are listed in Table 1. In general, annual temperatures averaged in the warm third of the historical distribution for the regions west of the Mississippi River and in the moderate range for those east of the Mississippi. Two regions ranked in the top ten category: The Southwest region had the sixth warmest year on record and the Northwest their eighth warmest year.

The regional precipitation pattern for 1994 consisted of dry conditions in the West and Northwest regions, wet conditions in the Northeast and Southeast, and moderate annual precipitation ranks in between (Table 1). In the Southeast region, 1994 ranked as the eighth wettest year, with four of the last six years well above the long-term mean (Figure 14). At the other extreme, the Northwest region had their eleventh driest year in 1994, with eight of the last ten years well below the long-term mean (Figure 15).

On a statewide basis, eight states (FL, plus the western states---AZ, ID, NV, NM, UT, WA, and WY) ranked in the top ten warmest category for the year 1994 (see Figure 16A). No states ranked in the top ten coldest category, with only one (Maine) even ranking in the cool third of the historical distribution. Six states (FL, GA, ND, PA, SC, and TN) ranked in the top ten wettest category (see Figure 16B). The only state in the top ten driest category---Idaho---had both the fourth driest and fourth warmest year in 1994.

The temperature pattern for the nation switched from the first half of 1994 to the second half. The predominant circulation pattern during January-June 1994 was an upper-level ridge in the western United States and a trough in the east. This brought persistently hot temperatures to the west, with eight states ranking in the top ten warmest category for January-June, and cold temperatures to the northeast, where Maine ranked sixth coldest (Figure 17A). This pattern broke down during the second half of 1994, with unusual warmth occurring in the northeastern quarter of the country and relatively cooler temperatures in the west (Figure 17B). Ten states---most in the northeastern quarter---ranked in the top ten warmest category for July-December 1994.

The unusual western warmth during the first half of 1994 was accompanied by unusual dryness, with three states having the tenth driest, or drier, January-June on record in 1994 (Figure 18A). Six states (from the Tennessee Valley to the Northeast) had the tenth wettest, or wetter, January-June in 1994, with Tennessee and West Virginia ranking as the wettest on record (Figure 18A). The circulation change during the

second half of the year brought drier conditions to the Northeast. Four states (FL, GA, ND, and SC) had the tenth wettest, or wetter, July-December on record in 1994 (Figure 18B).

A monthly breakdown of national temperature and precipitation conditions for 1994 is shown in Figures 19 and 20. Unusually warm conditions predominated in March, June, and December, unusually cold conditions characterized February, and both extremes were present over large areas during January, May, July, August, September, and November (Figure 19). Each month of 1994 was characterized by precipitation departures in both of the extreme categories. A significantly greater percentage of the country was very dry compared to very wet in March, May, August, and December, while the opposite occurred during October and November (Figure 20). In both figures, values in the upper tenth percentile are categorized as much above normal and those in the lowest 10th percentile as much below normal. The numbers at the top of each graph are the national temperature or precipitation rank for each month.

According to preliminary data from the National Weather Service's National Severe Storms Forecast Center, there were 1073 tornadoes across the contiguous United States during 1994 (Figure 21). This compares to the 1953-1993 average of 791. It should be noted that the preliminary tornado count is generally higher than the final count and that the tornado observations have generally improved with time as better observing practices and instrumentation (especially weather radar and satellites) were utilized.

TABLE 1. PRECIPITATION AND TEMPERATURE RANKS, BASED ON THE PERIOD 1895-1994. 1 = DRIEST/COLDEST, 100 = WETTEST/WARMEST.

REGION	DEC 1994	NOV-DEC 1994	JUL-DEC 1994	JAN-DEC 1994
PRECIPITATION:				
NORTHEAST	31	44	44	78
EAST NORTH CENTRAL	21	52	72	59
CENTRAL	30	55	31	57
SOUTHEAST	34	49	95	93
WEST NORTH CENTRAL	10	26	75	36
SOUTH	80	67	77	62
SOUTHWEST	55	74	52	44
NORTHWEST	29	23	21	11
WEST	53	57	47	22
NATIONAL	34	49	67	55
TEMPERATURE:				
NORTHEAST	94	99	90	41
EAST NORTH CENTRAL	91	96	90	59
CENTRAL	92	99	82	55
SOUTHEAST	91	98	67	63
WEST NORTH CENTRAL	76	69	77	78
SOUTH	83	95	76	73
SOUTHWEST	78	50	83	95
NORTHWEST	50	20	70	93
WEST	44	5	49	88
NATIONAL	90	92	87	85

TABLE 2.
STATISTICS FOR SELECTED RIVER BASINS: PRECIPITATION RANKING FOR OCT-DEC 1994, WHERE RANK OF 1 = DRIEST, 100 = WETTEST, BASED ON THE PERIOD 1895 TO 1994; AREAL PERCENT OF THE BASIN EXPERIENCING SEVERE OR EXTREME LONG-TERM (PALMER) DROUGHT, AND AREAL PERCENT OF THE BASIN EXPERIENCING SEVERE OR EXTREME LONG-TERM (PALMER) WET CONDITIONS, AS OF DEC 1994.
RIVER BASIN REGIONS AS DEFINED BY THE U.S. WATER RESOURCES COUNCIL.

RIVER BASIN	PRECIPITATION RANK	% AREA DRY	% AREA WET
MISSOURI BASIN	94	4.0%	22.9%
PACIFIC NORTHWEST BASIN	38	46.7%	.0%
CALIFORNIA RIVER BASIN	46	.0%	.0%
GREAT BASIN	77	.0%	.0%
UPPER COLORADO BASIN	43	68.4%	.0%
LOWER COLORADO BASIN	81	10.4%	18.3%
RIO GRANDE BASIN	75	.0%	13.3%
ARKANSAS-WHITE-RED BASIN	77	.0%	.0%
TEXAS GULF COAST BASIN	99	.0%	25.3%
SOURIS-RED-RAINY BASIN	97	.0%	88.6%
UPPER MISSISSIPPI BASIN	59	.0%	10.3%
LOWER MISSISSIPPI BASIN	57	.0%	.0%
GREAT LAKES BASIN	21	4.7%	14.9%
OHIO RIVER BASIN	21	8.6%	.0%
TENNESSEE RIVER BASIN	42	.0%	.0%
NEW ENGLAND BASIN	14	.0%	1.6%
MID-ATLANTIC BASIN	13	.0%	11.2%
SOUTH ATLANTIC-GULF BASIN	87	.0%	33.1%

TABLE 3. EXTREMES, 1961-90 NORMALS, AND 1994 VALUES FOR DEC

	PRECIPITATION (INCHES)					
	DRIEST		WETTEST		NORMAL	1994
REGION	VALUE	YEAR	VALUE	YEAR	PCPN	PCPN
NORTHEAST	.98	1955	6.74	1973	3.45	2.69
EAST NORTH CENTRAL	.37	1943	2.62	1982	1.44	.80
CENTRAL	.90	1958	7.58	1990	3.44	2.31
SOUTHEAST	1.18	1955	7.05	1953	3.87	3.15
WEST NORTH CENTRAL	.19	1986	1.20	1917	.65	.35
SOUTH	.64	1917	5.51	1911	2.49	3.17
SOUTHWEST	.11	1929	2.29	1965	.96	.90
NORTHWEST	1.17	1976	8.29	1964	4.03	2.77
WEST	.09	1989	7.05	1955	2.33	2.11
NATIONAL	1.22	1958	3.60	1982	2.30	1.96

	TEMPERATURE (DEGREES F)					
	COLDEST		WARMEST		NORMAL	1994
REGION	VALUE	YEAR	VALUE	YEAR	TEMP	TEMP
NORTHEAST	13.3	1989	34.5	1923	26.6	32.1
EAST NORTH CENTRAL	6.9	1983	29.0	1923	18.6	26.0
CENTRAL	21.9	1989	42.0	1923	33.0	39.2
SOUTHEAST	39.3	1989	55.9	1931	47.3	51.5
WEST NORTH CENTRAL	4.3	1983	30.0	1939	19.4	23.9
SOUTH	33.6	1983	51.0	1933	43.5	47.2
SOUTHWEST	24.8	1909	39.9	1980	32.6	35.2
NORTHWEST	21.9	1990	37.9	1917	29.4	30.1
WEST	33.0	1990	45.6	1929	38.7	38.7
NATIONAL	25.8	1983	38.4	1939	32.8	36.6

TABLE 4. TEMPERATURE AND PRECIPITATION RANKINGS FOR JAN-JUN 1994, BASED ON THE PERIOD 1895-1994. 1 = DRIEST/COLDEST, 100 = WETTEST/HOTTEST.

REGION	PRECIPITATION	TEMPERATURE
NORTHEAST	93	14
EAST NORTH CENTRAL	33	28
CENTRAL	76	31
SOUTHEAST	78	53
WEST NORTH CENTRAL	13	75
SOUTH	46	59
SOUTHWEST	45	96
NORTHWEST	14	92
WEST	21	94
NATIONAL	45	77

TABLE 5.
STATISTICS FOR SELECTED RIVER BASINS: PRECIPITATION RANKING FOR JAN-DEC 1994, WHERE RANK OF 1 = DRIEST, 100 = WETTEST, BASED ON THE PERIOD 1895 TO 1994. RIVER BASIN REGIONS AS DEFINED BY THE U.S. WATER RESOURCES COUNCIL.

RIVER BASIN	PRECIPITATION RANK
MISSOURI BASIN	24
PACIFIC NORTHWEST BASIN	11
CALIFORNIA RIVER BASIN	22
GREAT BASIN	46
UPPER COLORADO BASIN	15
LOWER COLORADO BASIN	52
RIO GRANDE BASIN	48
ARKANSAS-WHITE-RED BASIN	57
TEXAS GULF COAST BASIN	81
SOURIS-RED-RAINY BASIN	90
UPPER MISSISSIPPI BASIN	49
LOWER MISSISSIPPI BASIN	68
GREAT LAKES BASIN	49
OHIO RIVER BASIN	51
TENNESSEE RIVER BASIN	97
NEW ENGLAND BASIN	55
MID-ATLANTIC BASIN	87
SOUTH ATLANTIC-GULF BASIN	92

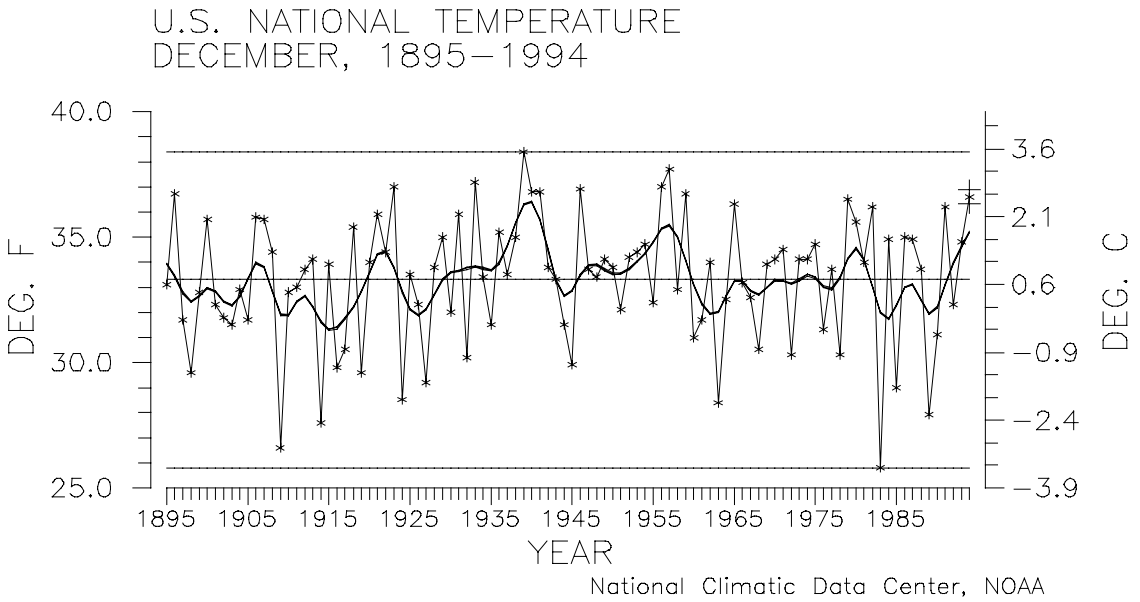
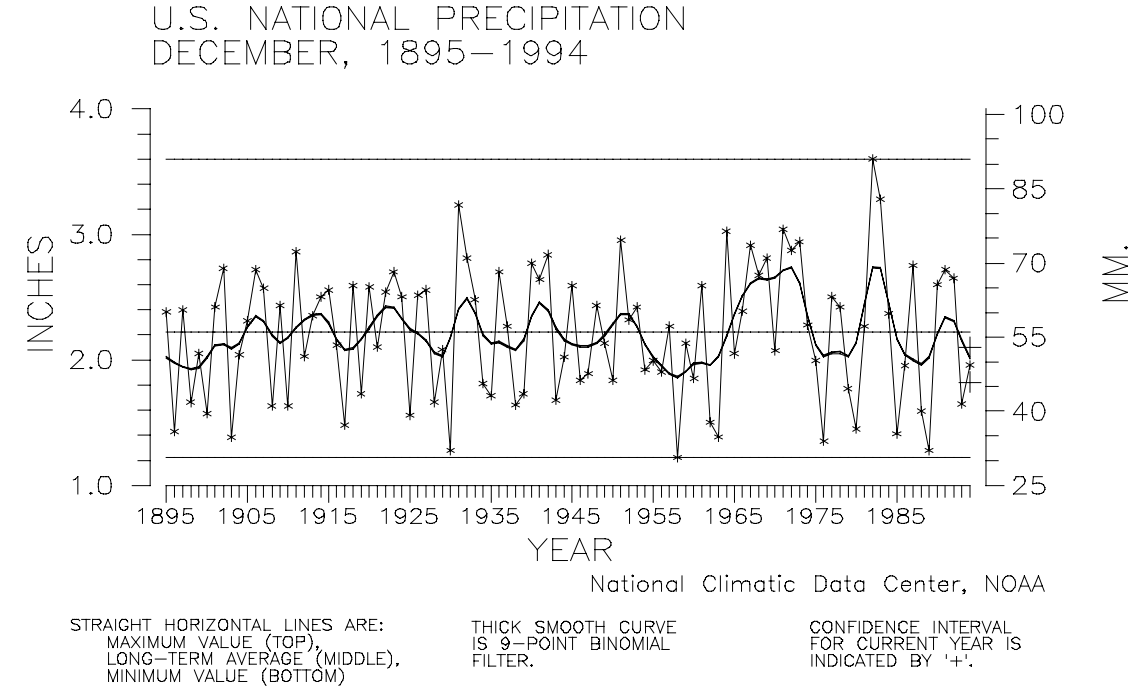


Figure 1



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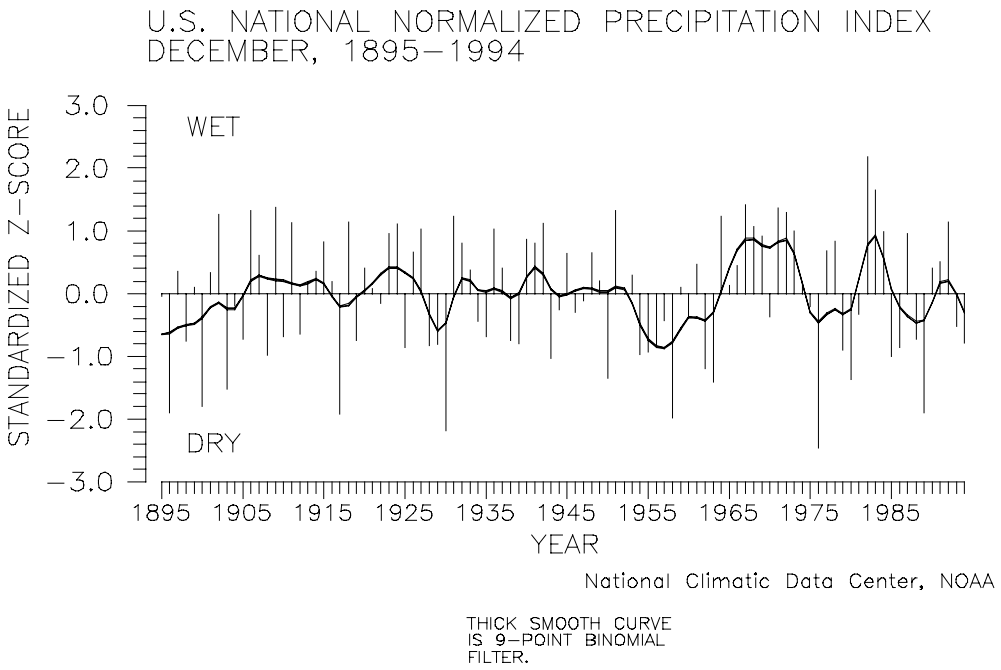


Figure 3

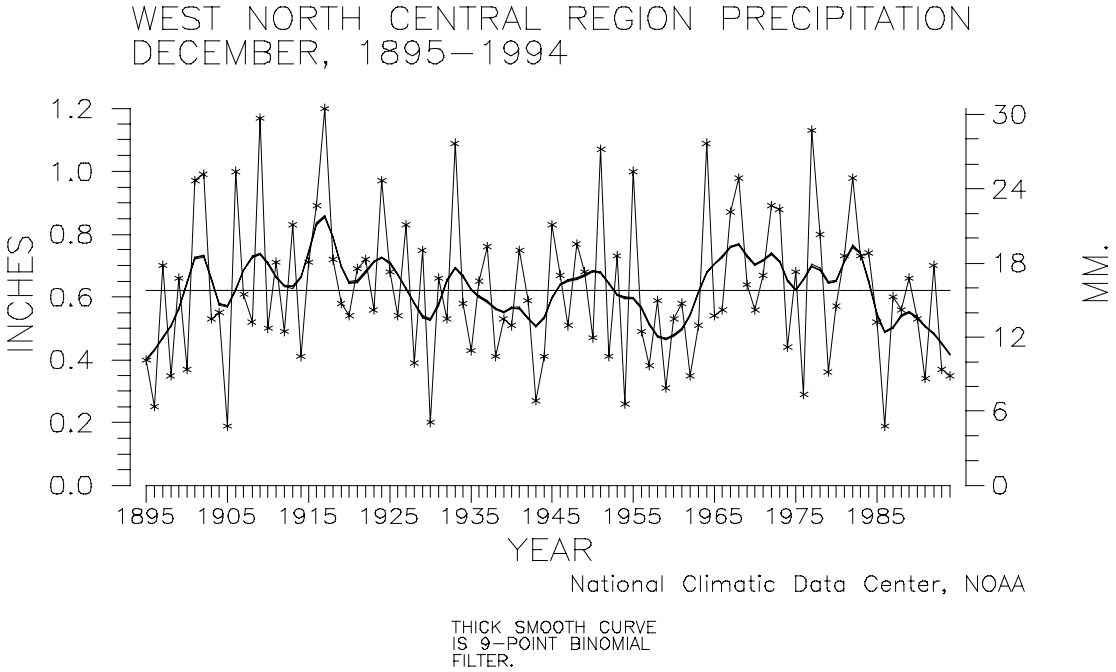


Figure 4

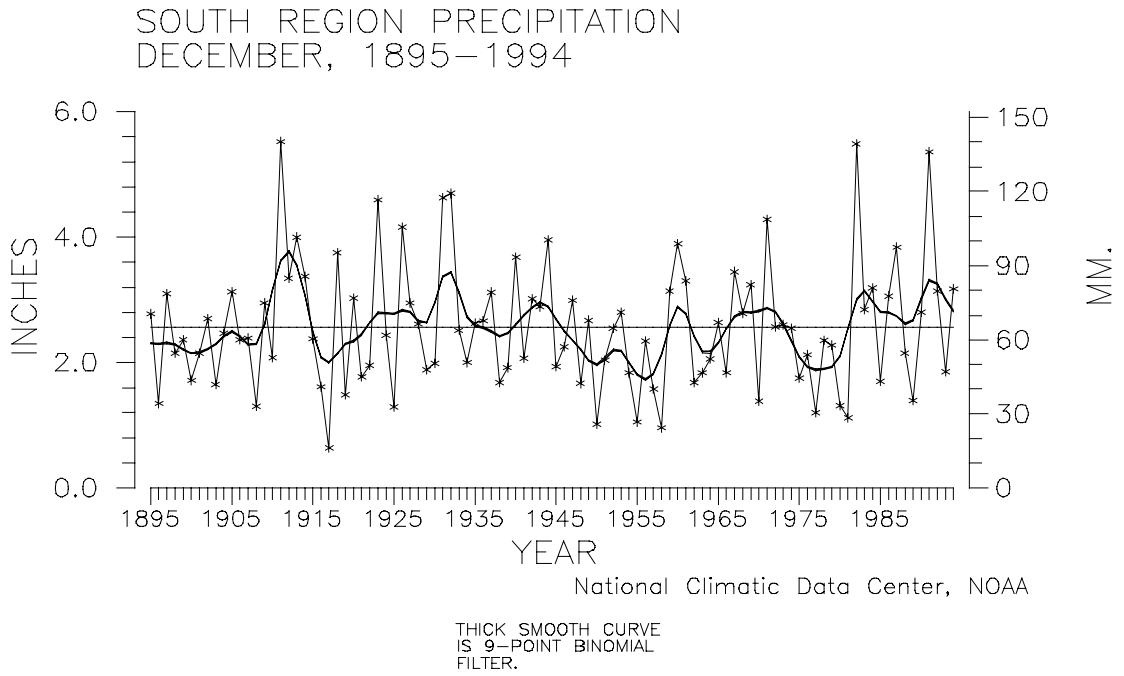


Figure 5

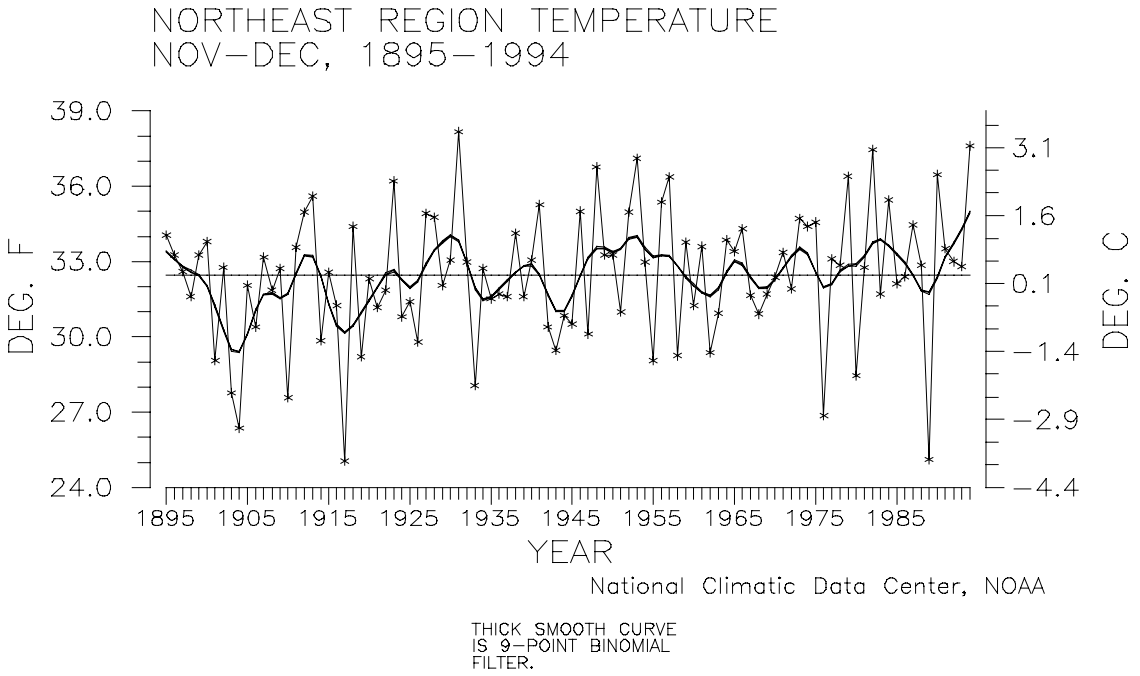
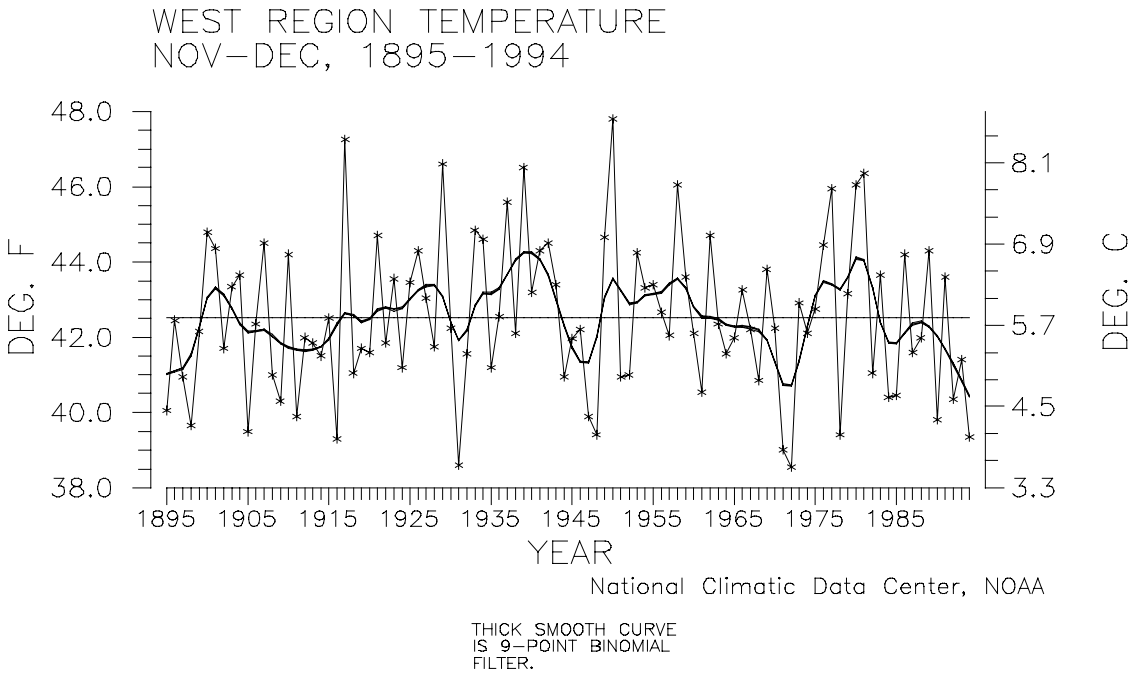


Figure 6



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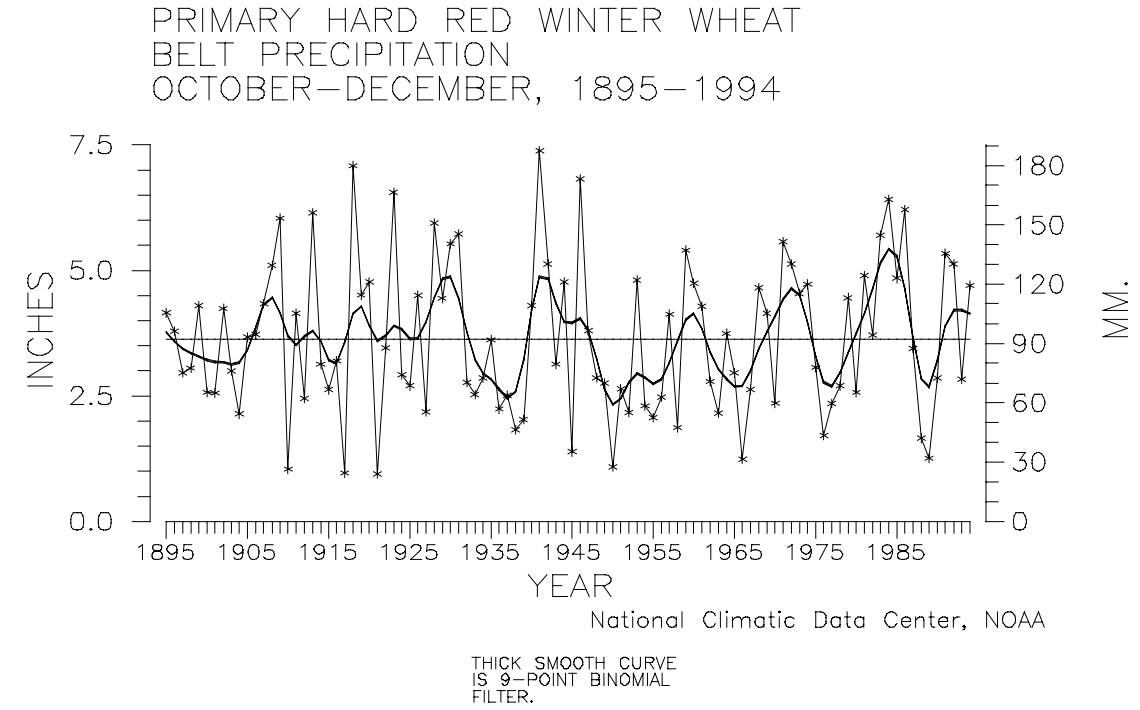


Figure 8

DECEMBER 1994 STATEWIDE RANKS

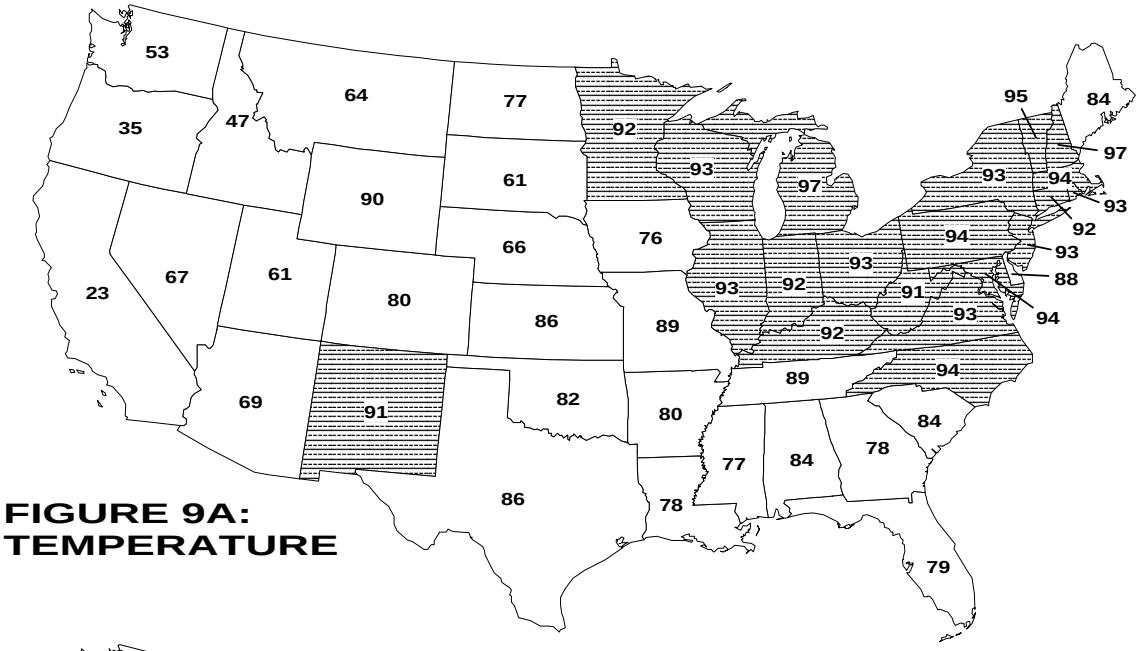


FIGURE 9A: TEMPERATURE

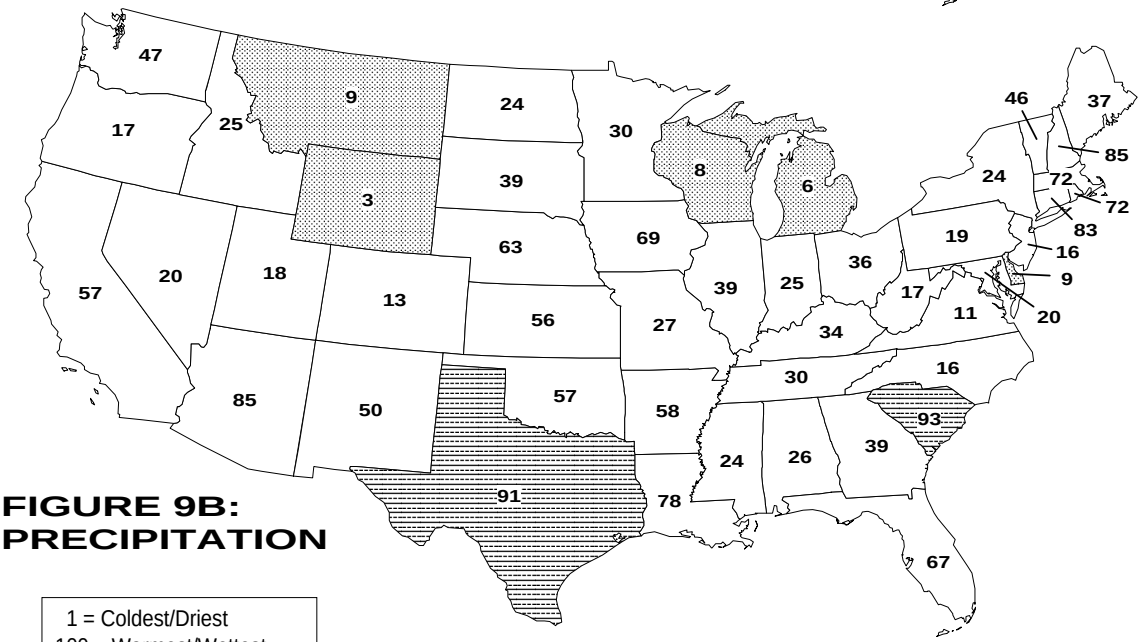


FIGURE 9B: PRECIPITATION

1 = Coldest/Driest
100 = Warmest/Wettest

National Climatic Data Center, NOAA

Temperature and Precipitation Ranks for the contiguous United States. Each state is ranked based on its data from 1895-1994. States having a rank of top ten coldest or driest (rank 1-10) or top ten warmest or wettest (rank 91-100) are shaded.

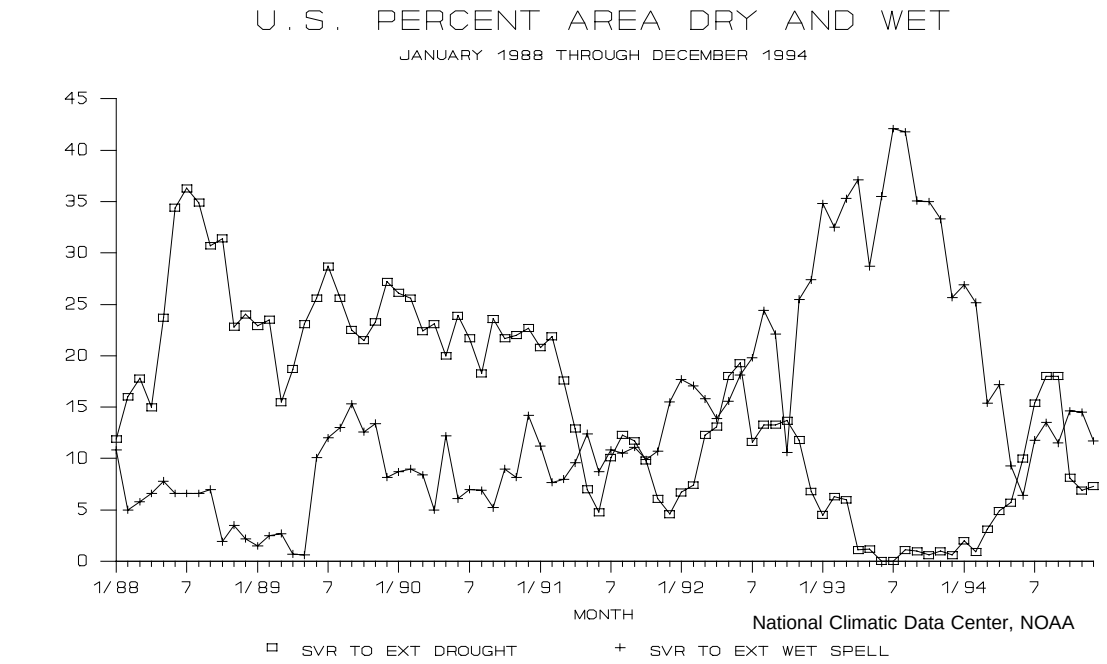
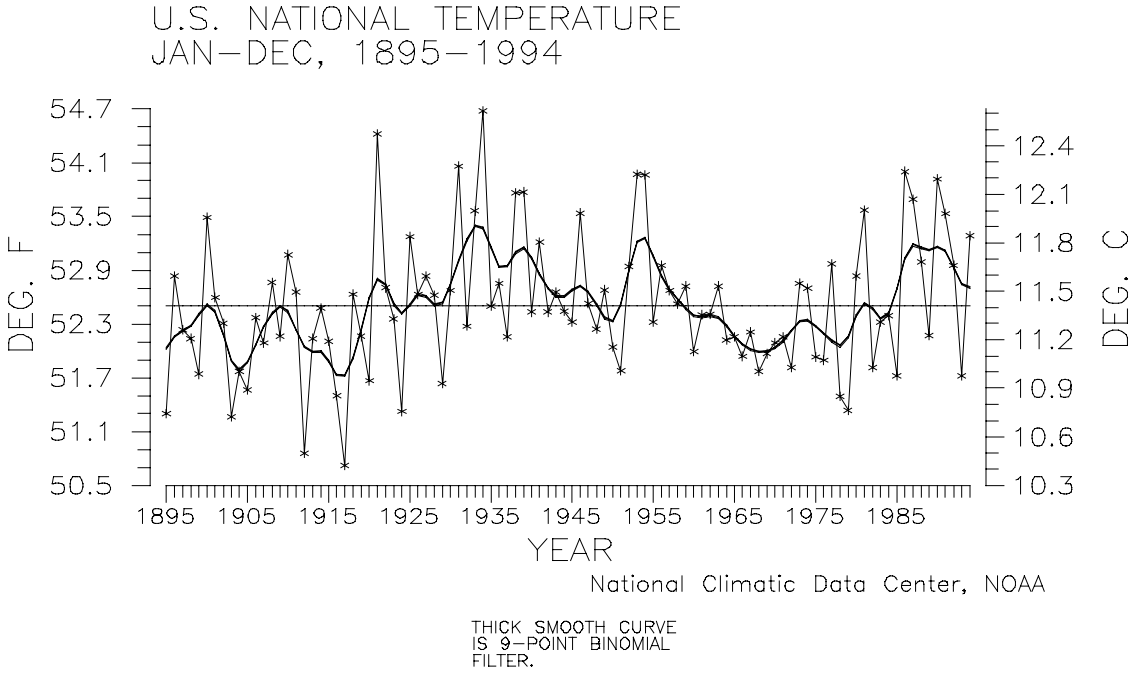


Figure 10



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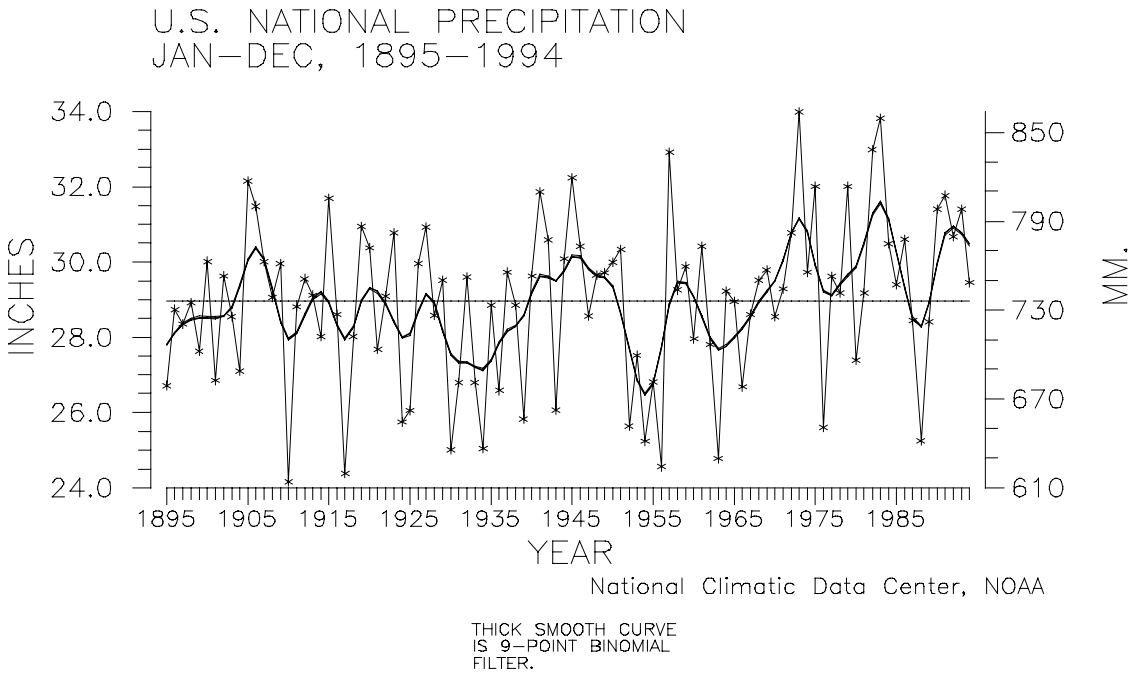


Figure 12

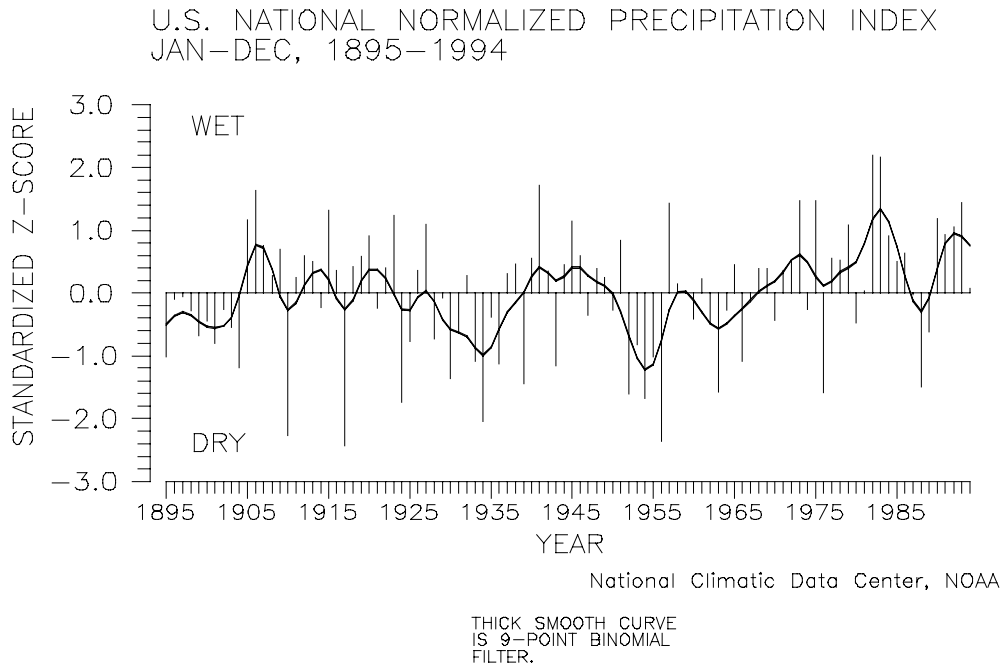


Figure 13

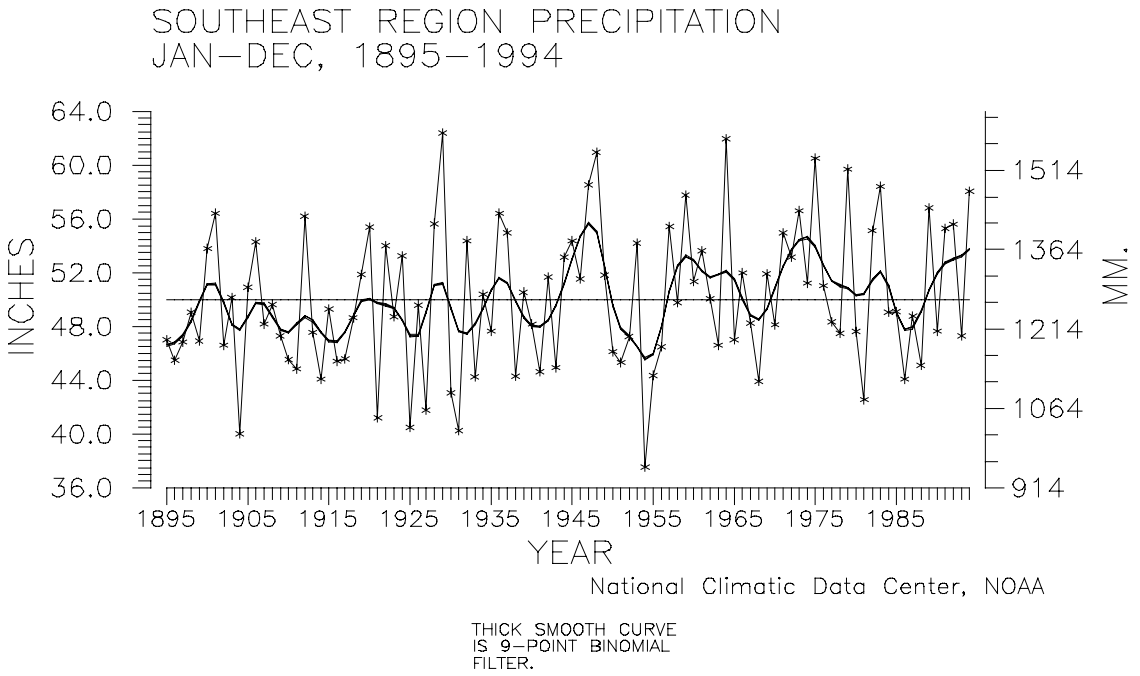


Figure 14

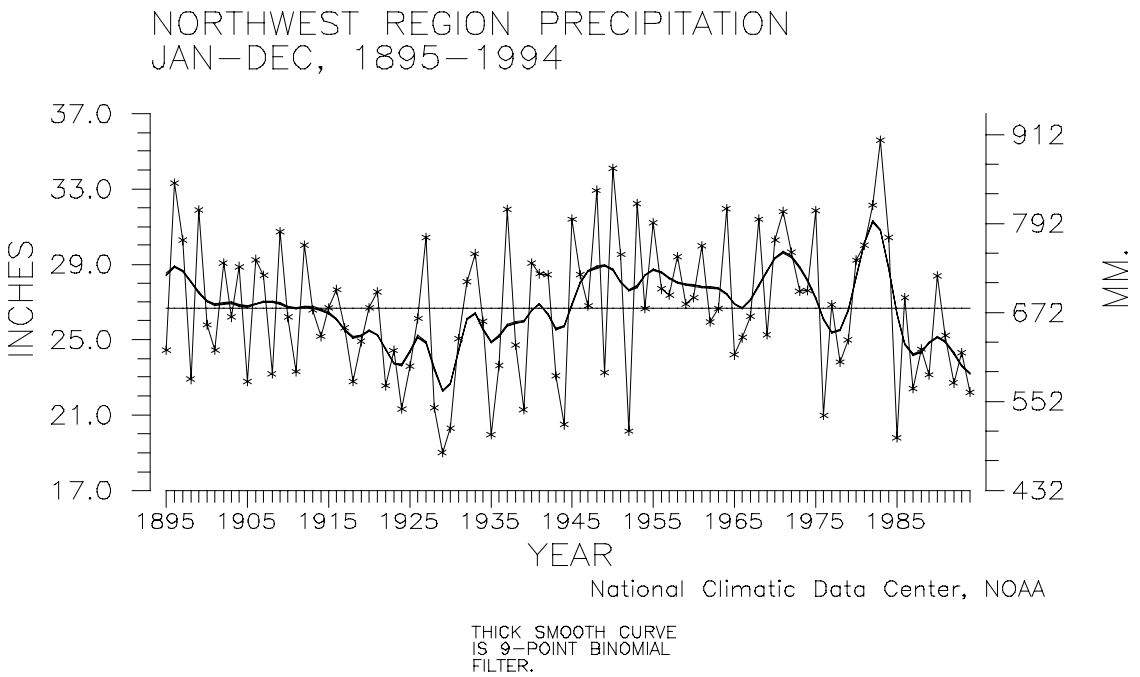


Figure 15

JAN-DEC 1994 STATEWIDE RANKS

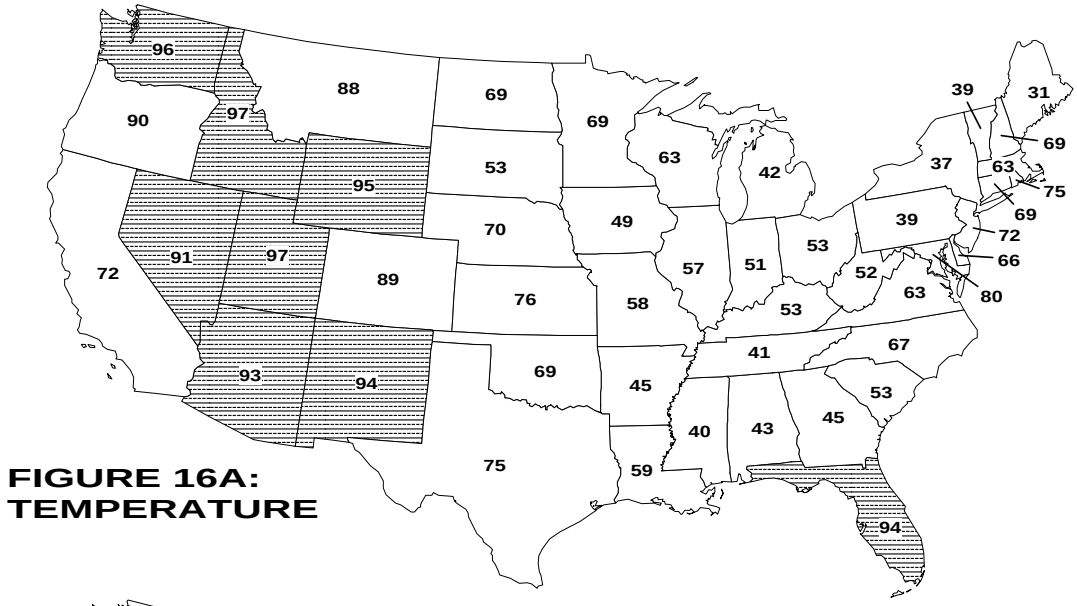


FIGURE 16A: TEMPERATURE

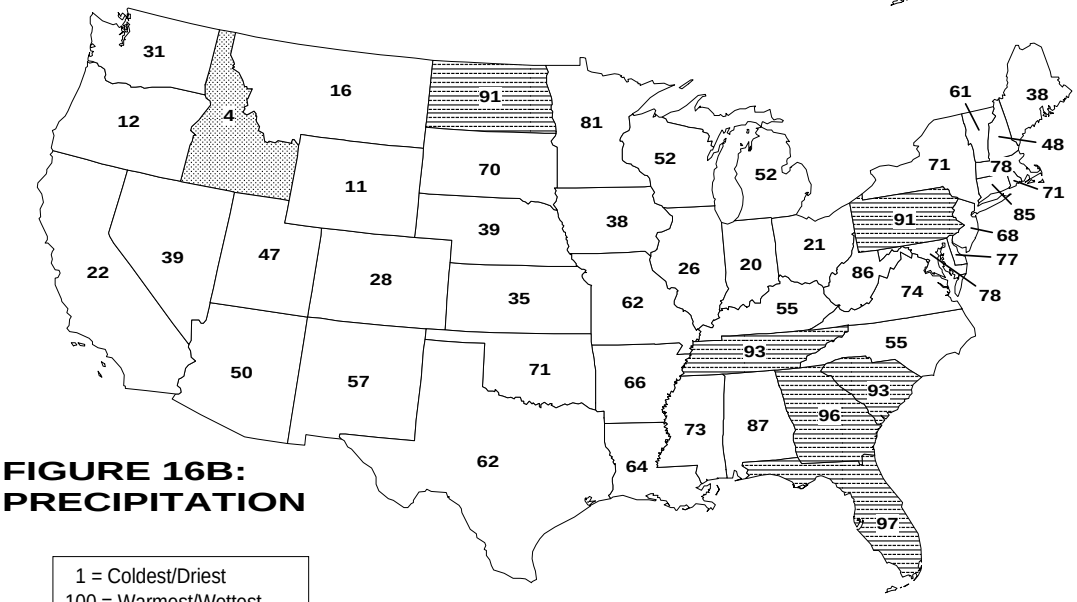


FIGURE 16B: PRECIPITATION

1 = Coldest/Driest
100 = Warmest/Wettest

National Climatic Data Center, NOAA

Temperature and Precipitation Ranks for the contiguous United States. Each state is ranked based on its data from 1895-1994. States having a rank of top ten coldest or driest (rank 1-10) or top ten warmest or wettest (rank 91-100) are shaded.

1994 STATEWIDE TEMPERATURE RANKS

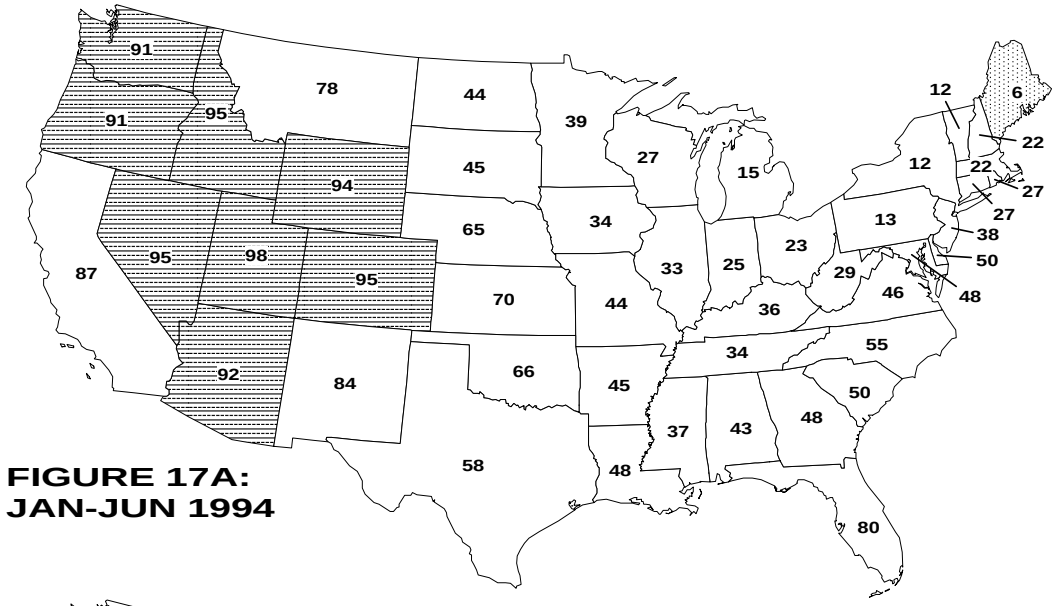


FIGURE 17A: JAN-JUN 1994

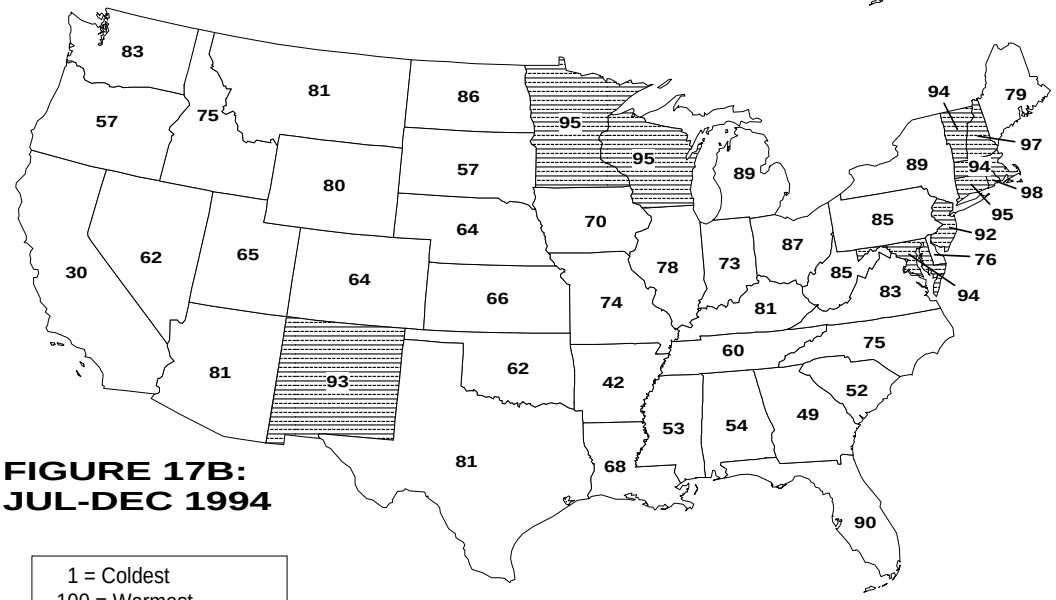


FIGURE 17B: JUL-DEC 1994

1 = Coldest
100 = Warmest

National Climatic Data Center, NOAA

Temperature Ranks for the contiguous United States.
Each state is ranked based on its data from 1895-1994.
States having a rank of top ten coldest (rank 1-10) or
top ten warmest (rank 91-100) are shaded.

1994 STATEWIDE PRECIPITATION RANKS

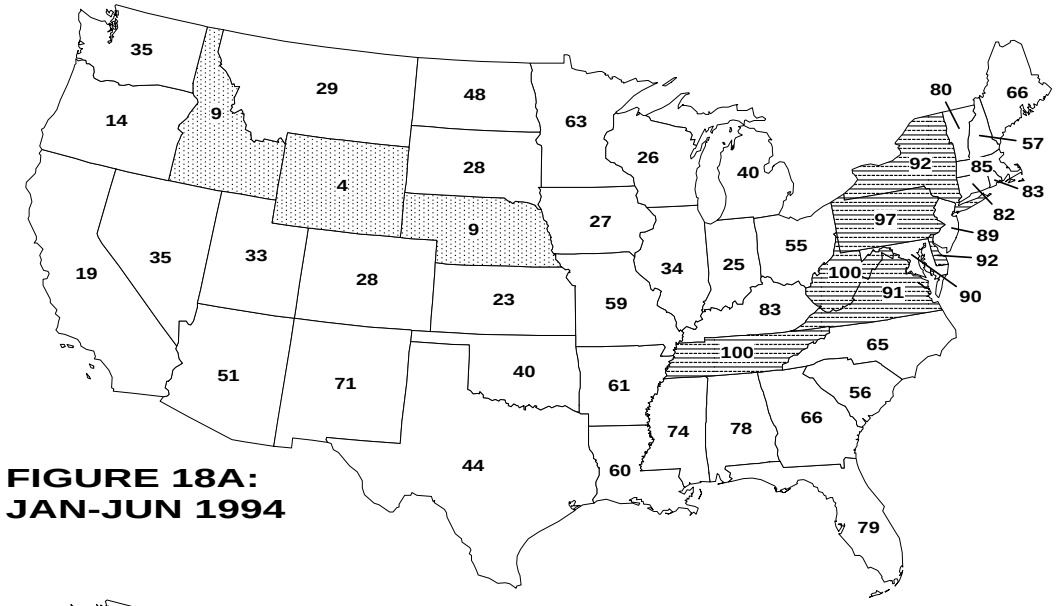


FIGURE 18A: JAN-JUN 1994

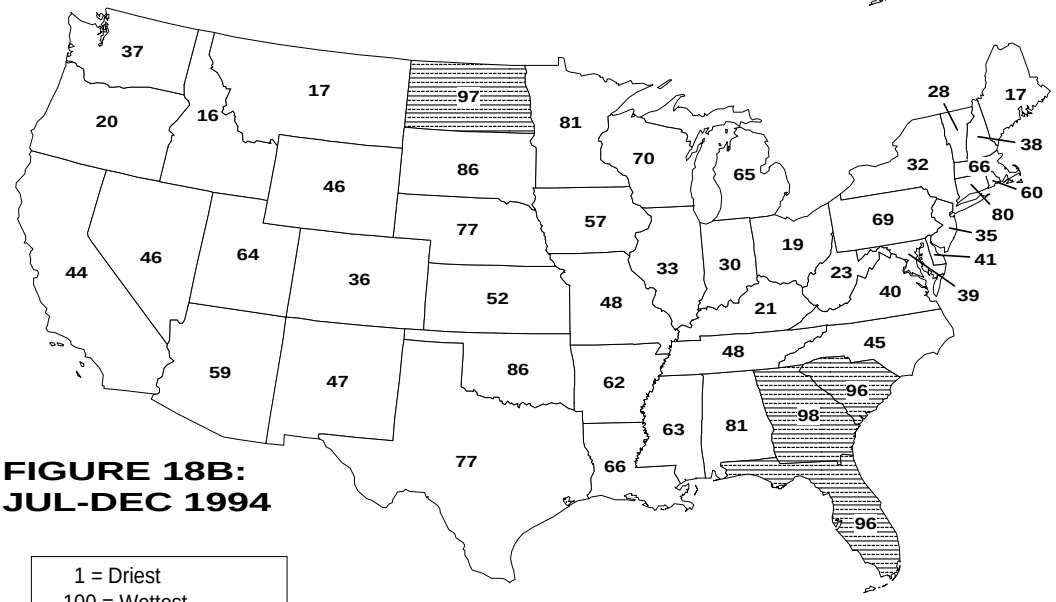


FIGURE 18B: JUL-DEC 1994

1 = Driest
100 = Wettest

National Climatic Data Center, NOAA

Precipitation Ranks for the contiguous United States.
Each state is ranked based on its data from 1895-1994.
States having a rank of top ten driest (rank 1-10) or
top ten wettest (rank 91-100) are shaded.

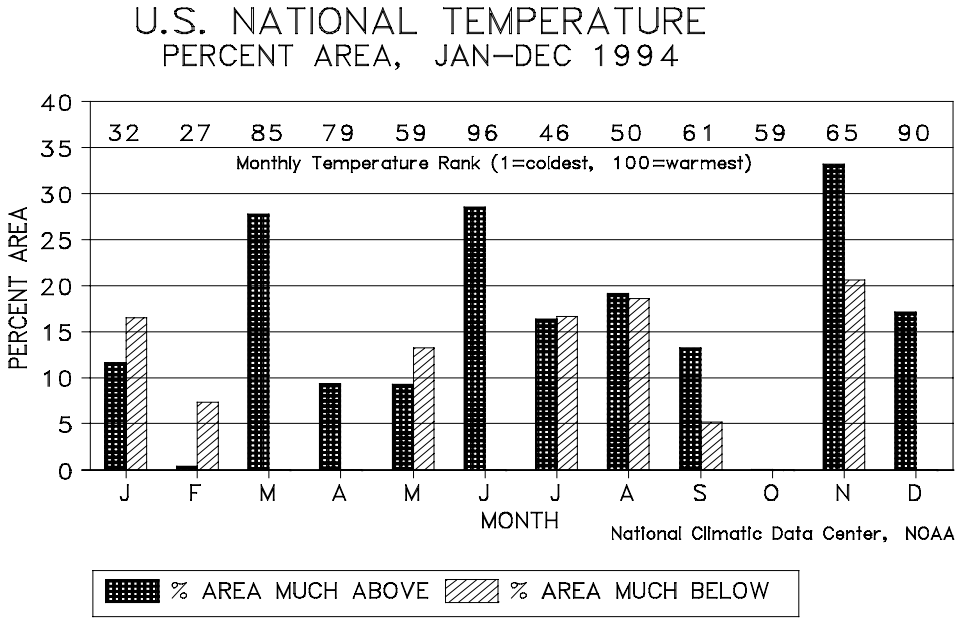


Figure 19

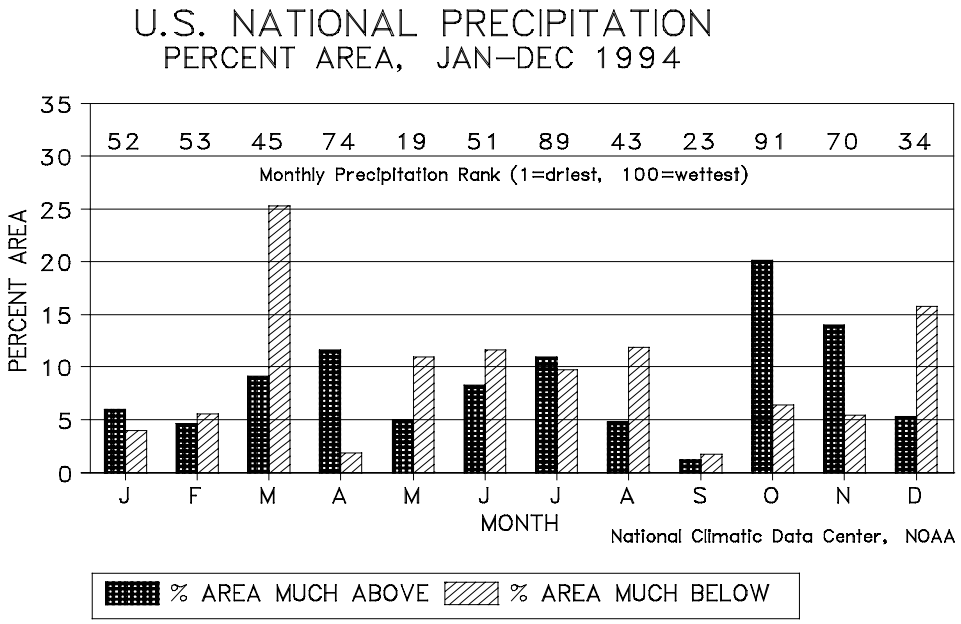
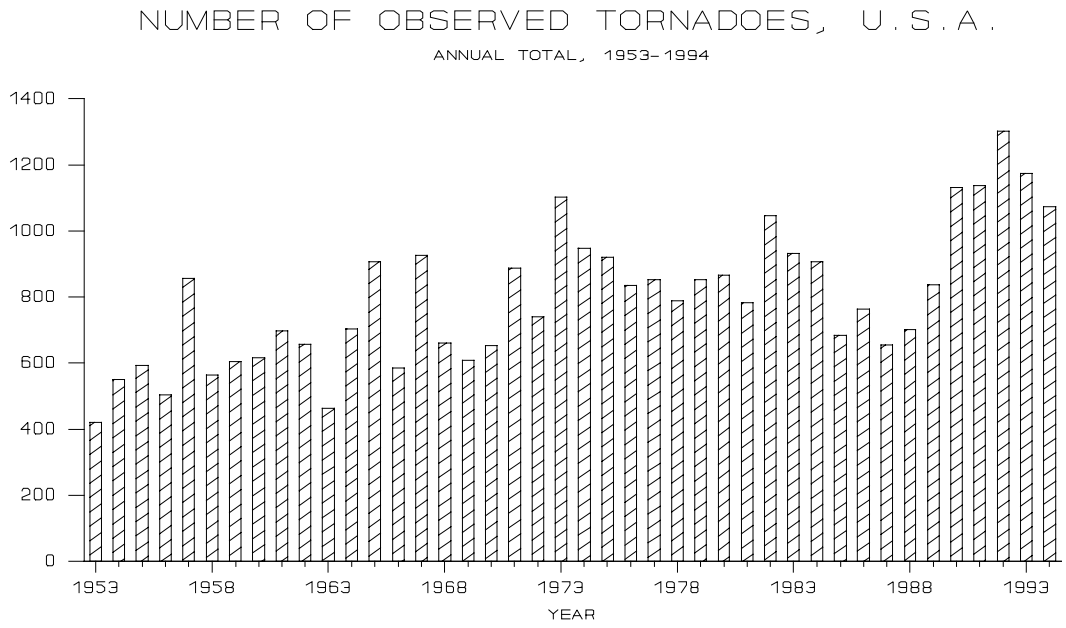


Figure 20



National Climatic Data Center, NOAA

Figure 21